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Peculiarities of self-diffusion of alkane molecules in kaolinite

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Abstract

Self-diffusion of alkanes in kaolinite has been explored by pulsed field gradient nuclear magnetic resonance. The concentration dependences of average self-diffusion coefficient (SDC) of liquid have been studied in the wide temperature interval (T=253-383 K). The translational mobility of alkane molecules in kaolinite was shown to have some specific peculiarities. An anomalous rise was found in the average self-diffusion coefficient of the liquid as its content in kaolinite decreased. To explain this we should introduce a new "gas-like" state for the diffusant, whose mobility exceeds that of pure liquid. The possibility of the existence of such a state is explained by kaolinite's ability to increase the specific surface area of the induced liquid. Analysis of a shape of the spin-echo diffusion attenuation leads one to suppose that there are heterogeneities in the medium's porous space. © 1991 Springer.

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